Installation guide

Ultrastar 18ES

Multi-mode SE/LVD

Models: DNES-309170
DNES-318350

Table of contents

Introduction . . . . . Page 3
Hardware description . . . . . Page 4
Hard disk drive handling guide . . . . . Page 5
Hard disk drive installation flow chart . . . . . Page 6
Step 1: Installation checklist . . . . . Page 7
Step 2: Prepare for installation . . . . . Page 8
Step 3: Jumper Settings . . . . . Page 9
Step 4: Mounting . . . . . Page 12
Step 5: Connectors . . . . . Page 13
Step 6: Complete physical installation . . . . . Page 14
Step 7: Installation and configuration . . . . . Page 14
Step 8: FDISK . . . . . Page 17
Step 9: Formatting . . . . . Page 19
Step 10: Operating system installation . . . . . Page 19
Appendix . . . . . Page 20
Glossary . . . . . Page 26

Introduction

This manual was prepared to help you install your IBM Ultrastar 18ES hard drive in most computer systems. If you do not feel comfortable installing this drive yourself, contact a qualified installer to assist you.

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http://www.ibm.com/harddrive

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Hardware description

The Ultrastar 18ES is available in various models with the following options:

- Capacity of 18 or 9GB
- 50, 68, or 80 pin connectors
- 50 pin SCSI connectors use the SCSI A connector.
- 68 pin SCSI connectors use the SCSI P connector.
- 80 pin SCSI connectors use the SCA-2 connector

Capacity	Model	SCSI Pins/Connector Type	SCSI Electrical Signal Type
9GB	DNES-309170	50 / Unitized Connector	Ultra SCSI
9GB	DNES-309170	68 / Unitized Connector	Ultra SCSI
9GB	DNES-309170	68 / Unitized Connector	Low Voltage Differential (Ultra2)
9GB	DNES-309170	80 / SCA-2	Low Voltage Differential (Ultra2)
18GB	DNES-318350	50 / Unitized Connector	Ultra SCSI
18GB	DNES-318350	68 / Unitized Connector	Ultra SCSI
18GB	DNES-318350	68 / Unitized Connector	Low Voltage Differential (Ultra2)
18GB	DNES-318350	80 / SCA-2	Low Voltage Differential (Ultra2)

These drives offer an advanced LVD interface that supports transfer rates of up to 80 MB/sec. To take advantage of the higher transfer rate of 80 MB/sec, your computer will need to have a controller that supports the LVD interface. If you have a SCSI controller that does not support this interface, the drive will still function, but will be limited to data transfer speeds significantly lower than 80MB/sec due to the lower speed of your controller. If you have a slower controller, you may wish to purchase an LVD controller card to take advantage of Ultrastar's 80 MB/sec data transfer rate. An LVD controller card will fit into any available slot in your computer. To determine if your current controller card is LVD, check the documentation that came with your controller or contact the controller manufacturer.

If you currently have single-ended wide SCSI drives and a non-LVD controller, you may still attach the LVD model Ultrastar 18ES to the existing cable. If you choose to replace your non-LVD controller with an LVD model, in most cases, single-ended wide SCSI drives can be attached to the same bus with an LVD drive. However, there are some LVD controllers that do not support single-ended wide SCSI drives. Check the documentation that came with your controller or contact the manufacturer to ensure that your LVD controller will support single-ended wide SCSI drives.

The Ultrastar 18ES family is ideal use by video producers and movie editors. These drives are designed to work with MMX systems. Compatibility listings are included in the appendix. Before you begin installation, please read the "Hard disk drive handling guide" on the following page.

Hard disk drive handling guide

These notes are designed to provide a simple overview of the need for caution when handling a disk drive.

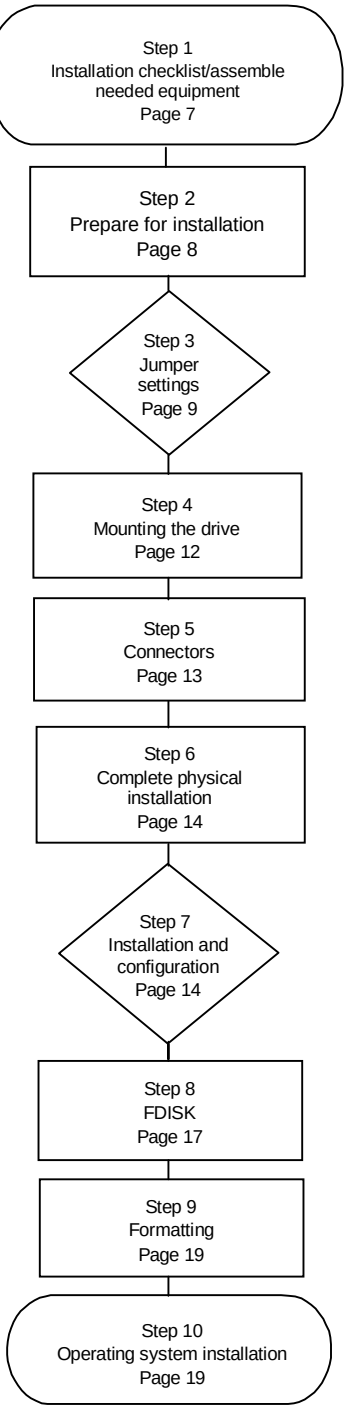
Disk drives can be easily damaged by electrical static shock or rough handling. In order to minimize the risk of damage to a disk drive, it is essential that the drive be handled while resting on a cushioned surface (which is electrostatically safe). Examples of static-safe mats available at the time of this printing are 3M's 8210 table mat and 3M's "First Touch" computer pad.

Great care should be taken when handling disk drives. Do not bump them against any object. When attaching brackets or mounting the drive in the computer, be very careful. It is *very easy* to unintentionally cause shocks which exceed specifications.

Please note that the capacity of each disk drive to withstand electrical or mechanical shock varies according to its design. The IBM Hard Disk Drive Technical Support Center can advise you on the suitability of your Ultrastar drive for a specific application.

Damage incurred to a drive might not be immediately evident and could cause the drive to fail months later.

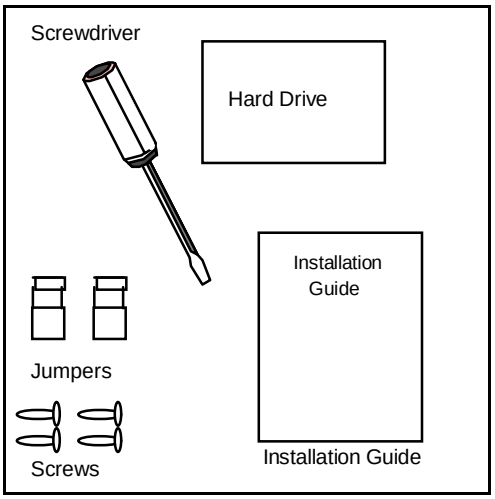
Hard disk drive installation flow chart



Step 1: Installation checklist

To install the Ultrastar drive you may need the following items, depending on your computer's components:

- The installation kit (as shown in the diagram below) containing the Ultrastar drive, 4 mounting screws, and any related publications. Save the box the drive came in.



- The documentation that came with your computer or storage enclosure.
- A small, flat-blade screwdriver.
- A SCSI controller, which is either built-in or an adapter inside your computer, and any related documentation.
- Mounting brackets, if required for your computer. Contact your place of purchase if you are not certain if mounting brackets are required.
- A bootable DOS diskette. (See the section entitled *Making a bootable diskette* in the appendix.)
- If you are replacing an older internal drive with the new Ultrastar drive and want to copy all of the files from the older drive to the new drive, you may need additional software. (See the section entitled *Drive copy* in the Appendix.)

Step 2: Prepare for installation

Begin by backing up your existing drive to avoid any loss of data during installation. (See the section entitled *Backup and Restore* in the Appendix.) After completing the backup, shut down as normal.

Opening your computer

- Turn the system off.
- Unplug the power cord from the wall outlet.
- Remove all cables from the back of your computer, labeling them if necessary.
- Remove the cover from your computer. (Consult your user's guide for instructions if needed.)

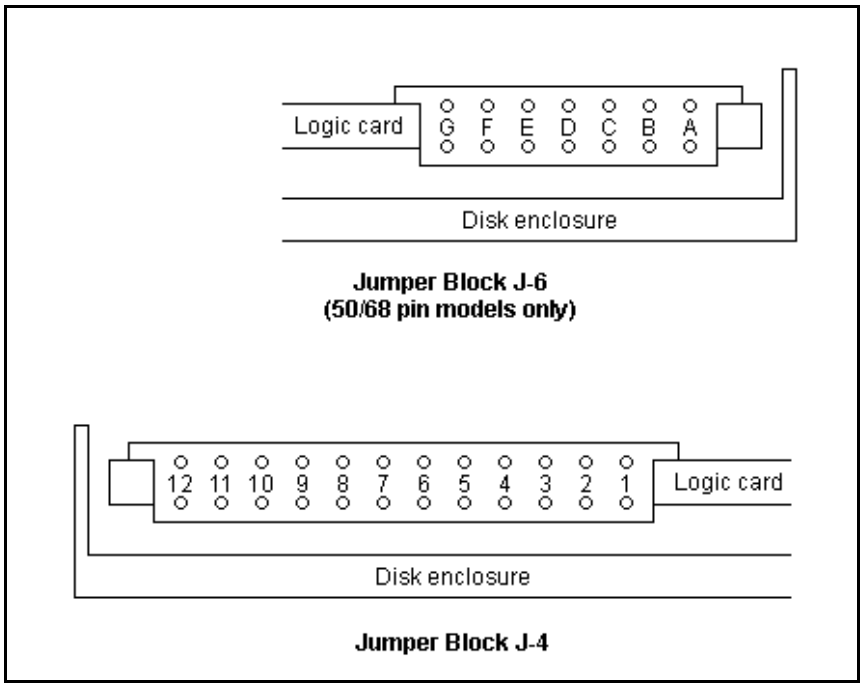
Unpackaging your hard drive

- If available, use an ESD (Electronic Static Discharge) wrist strap while handling your drive.
- If an ESD wrist strap is not available, discharge static electricity by establishing a common voltage between your body and the hard drive. Simultaneously touch the hard drive in its antistatic bag and an unpainted metal surface on the outside of your computer system with your bare hands.
- Remove the drive from the antistatic package that it was shipped in. Handle the drive only by the sides and avoid excessive movement until the drive has been mounted.
- Do not touch the main computer chip board.
- Do not drop the drive. A drop from *only 1/4 inch* could permanently damage your hard drive.
- Place the drive carefully on a static free area.
- Record the following information:
  Drive Model _____ Date of Purchase_____ Drive P/N _____ Place of Purchase_____ Serial # _____

Note:Do not low-level format your drive! IBM drives are low-level formatted by the manufacturer and reformatting may cause permanent damage to your drive and your system. (See the section entitled *Utilities* in the Appendix.)

Step 3: Jumper settings

The jumper settings are found on the hard drive on the opposite end of the interface connector (see diagram page 12). They are physical settings that must be changed for different uses of a hard drive. As shown below, there are two option jumper blocks located on the card of 50 and 68 pin models of the Ultrastar 18ES. 80 pin models have only one option jumper block.


Logic card
G F E D C B A
Disk enclosure
Jumper Block J-6
(50/68 pin models only)
12 11 10 9 8 7 6 5 4 3 2 1
Logic card
Disk enclosure
Jumper Block J-4

SCSI ID Jumpers

Each SCSI device will need to have its own SCSI ID. You can use ID 0 through ID 15, reserving ID 7 for your controller card. Follow the table below to set an ID on your SCSI drive.

Bit 3	Bit 2	Bit 1	Bit 0	Address
off	off	off	off	0
off	off	off	on	1
off	off	on	off	2
off	off	on	on	3
off	on	off	off	4
off	on	off	on	5
off	on	on	off	6
off	on	on	on	7*
on	off	off	off	8
on	off	off	on	9
on	off	on	off	10
on	off	on	on	11
on	on	off	off	12
on	on	off	on	13
on	on	on	off	14
on	on	on	on	15

*Reserved for controller card

SCSI address determination

Drive Termination

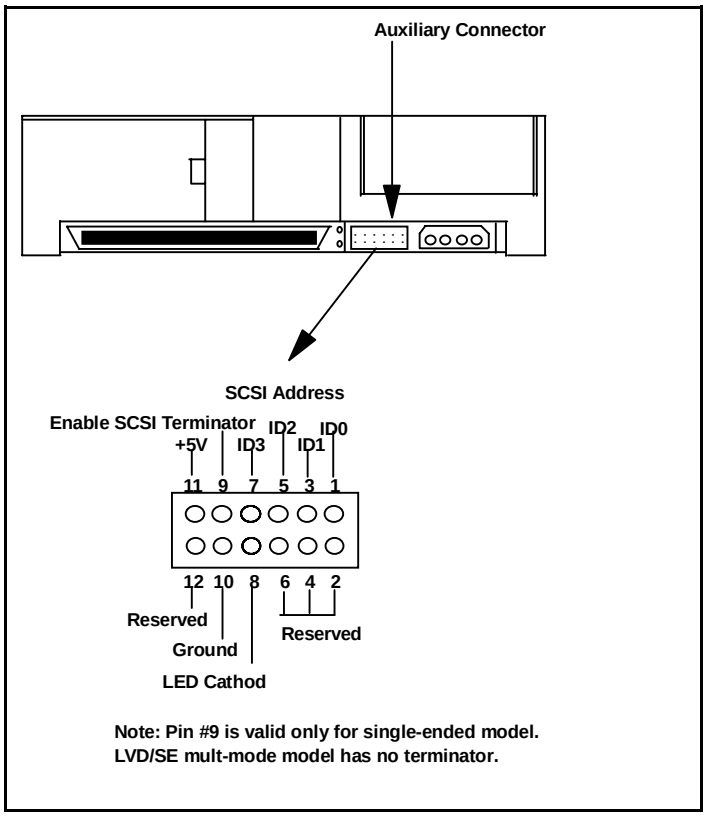
The SCSI bus must be terminated at both ends of the bus. If you have a single-ended Ultrastar 18ES, active termination is supplied on the jumper block. Ultra2 SCSI (LVD) models do not have onboard active termination. You will need to supply an external Ultra2 compatible terminator.

Termination Power

Some controllers may require the drive to supply 5 volts of power to the bus to aid termination. If your controller requires this, place a jumper on the Termination Power Enable jumpers to the side of the jumper block. These pins require a 2.54mm jumper shunt.

Auxiliary Option Jumper Block

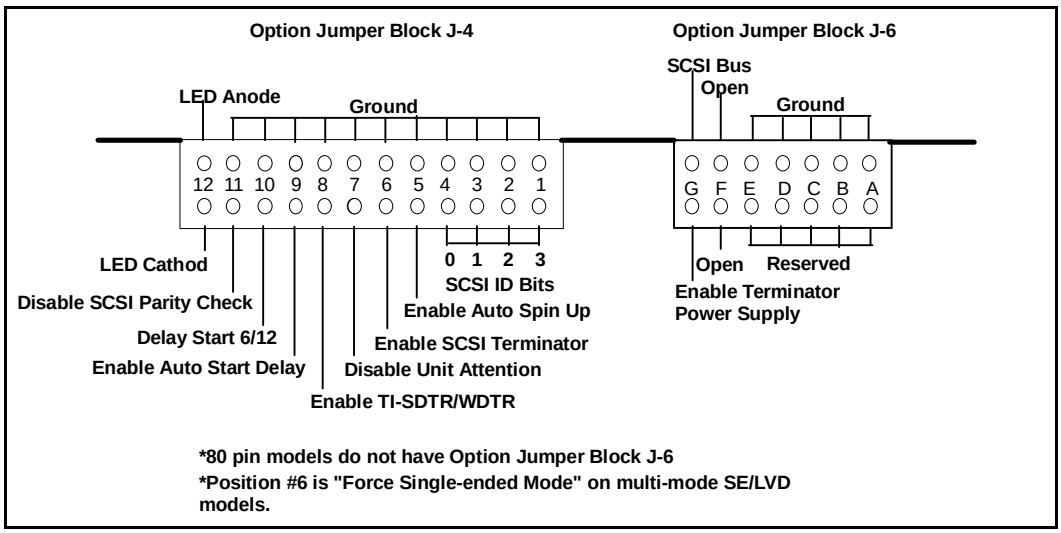
The 68 pin models contain an auxiliary connector that replicates some of the functions provided by the front option jumper block. The auxiliary connector should only be used if you have a combination "ganged" switch, typically found in external drive enclosures. The front option block and the auxiliary option block may not be used simultaneously.



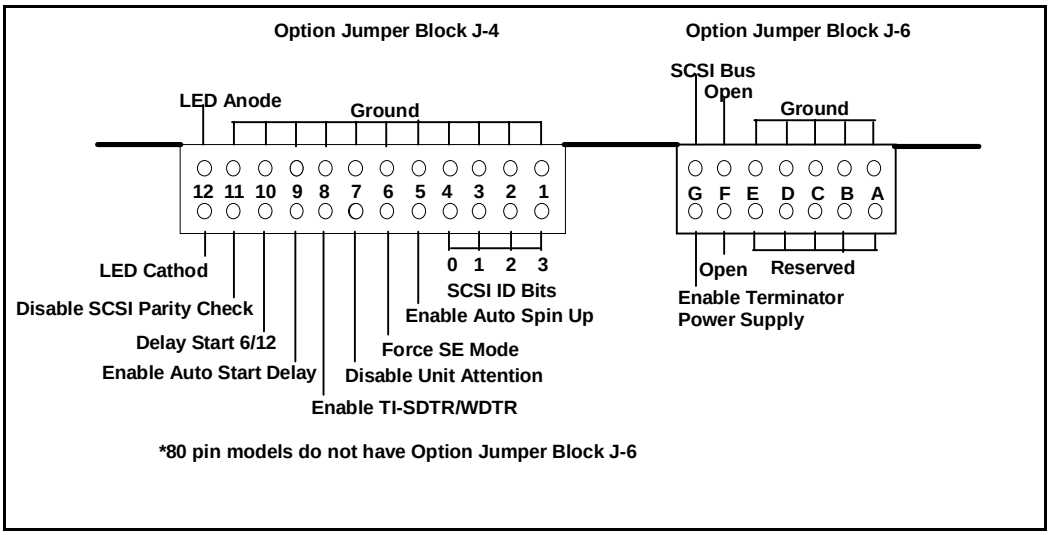
Auxiliary connector

Additional Jumper Options

The Ultrastar drives offer additional options on the jumper block. See Appendix for details of the additional jumper options shown below.



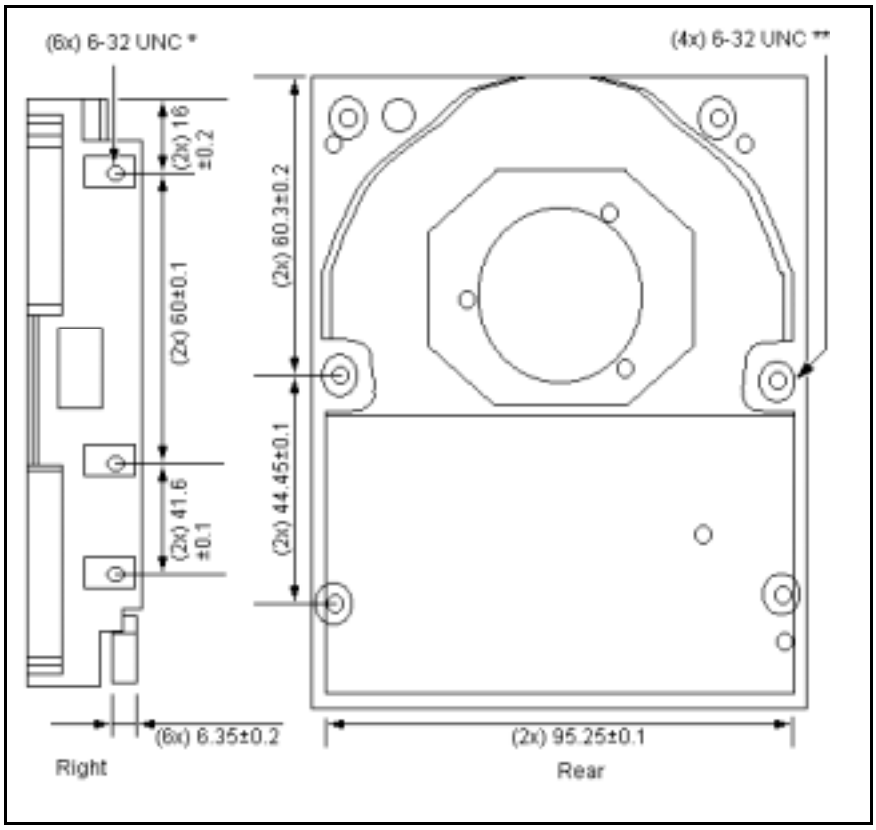
Jumper settings for single-ended models



Jumper settings for Ultra2 SCSI (LVD) models

Step 4: Mounting

After setting the jumpers, mount the hard drive in your system. The Ultrastar drive can be mounted with any of its six surfaces facing down. See below for mounting hole locations.



Mounting hole locations

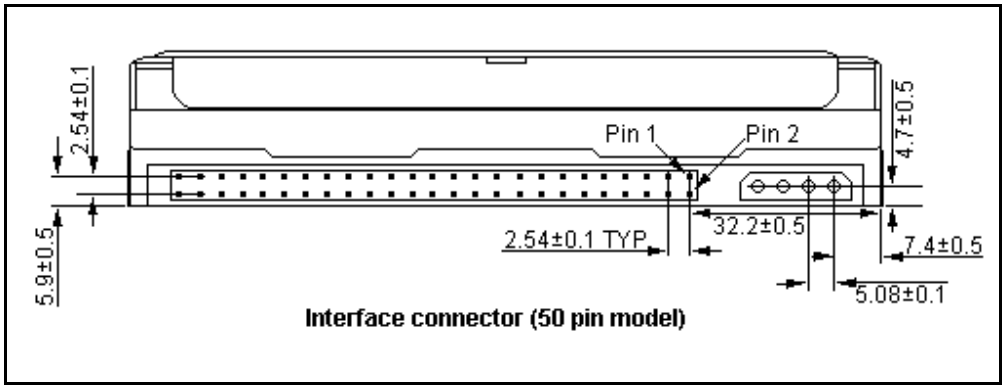
You must ensure that the drive has sufficient air flow. Mount the drive in the system using four 6-32 UNC screws. The maximum screw length is 3.5 mm for the side holes and 6 mm for the bottom holes. Mount the drive securely enough to prevent excessive motion or vibration.

If you are mounting your drive in a 5 inch bay, you may need to purchase mounting brackets from your computer manufacturer for the drive to be mounted securely.

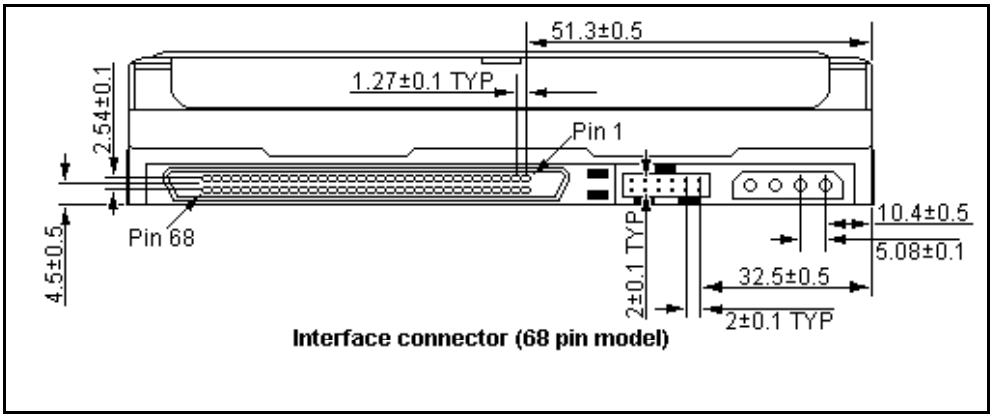
Step 5: Connectors

50 and 68 pin drives

After the drive has been carefully mounted, connect the SCSI cable and the power cable to the drive. (Note that the SCSI connector and power connector are keyed for proper insertion.)



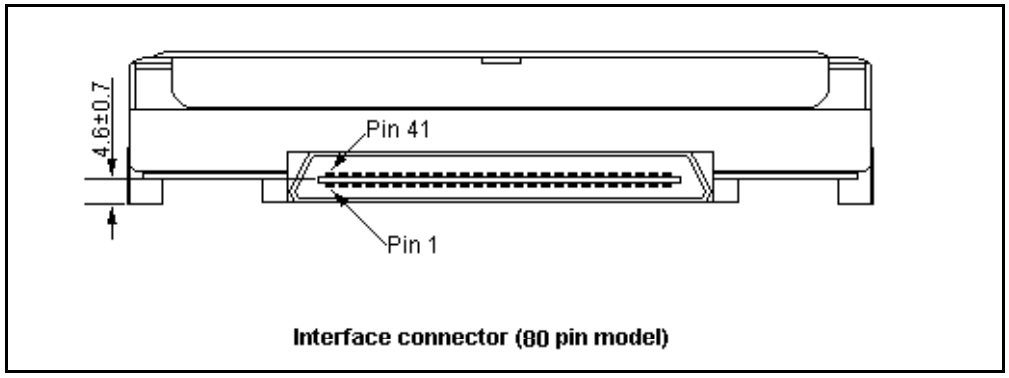
50 pin connector



68 pin connector

80 pin drives

80 pin drives are to be plugged into backplanes of servers and require no cables. If you have an 80 pin drive that you want to connect to a 68 pin SCSI cable, you will need to purchase a converter. Be aware that not all SCA converters support LVD mode.



80 pin connector

Step 6: Complete physical installation

Verify that the cable is properly connected to the SCSI controller. Replace the cover on the computer, connect all cables, and plug the power cord into the wall.

Step 7: Installation and configuration

If you have just added a SCSI controller card, follow the manufacturer's instructions to install the card.

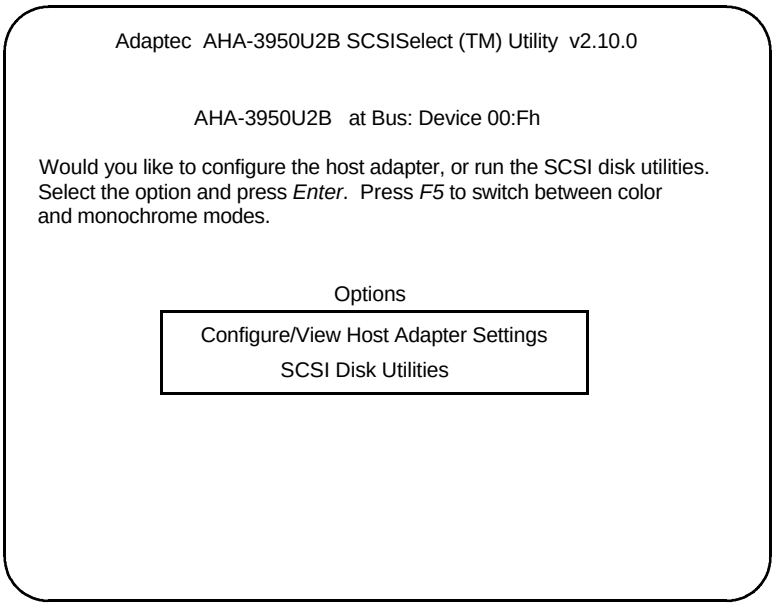
Boot computer

"Booting" means turning on your computer. Turn on your computer after you have inserted a bootable diskette. You should see the drive listed when the system is booting.

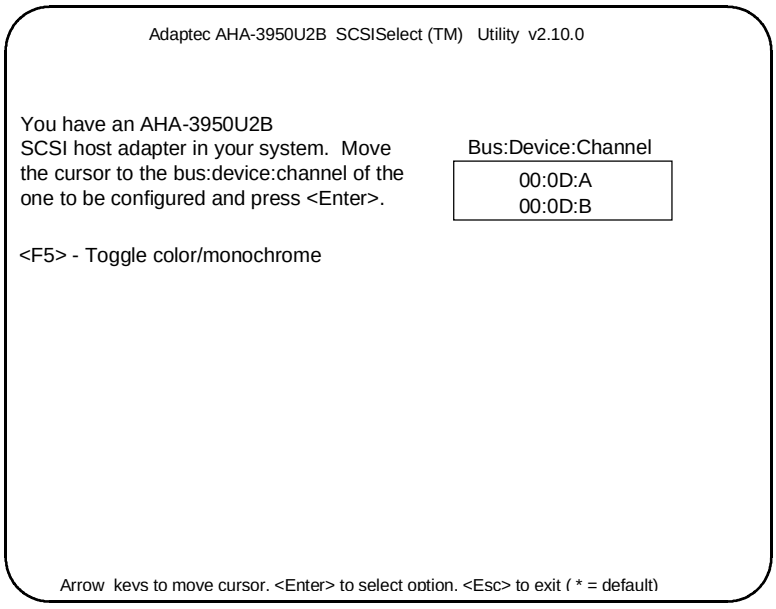
Note: The example below uses the Adaptec 3950U2B controller and the Model DRVS-09D drive.

```
Adaptec AHA - 3950U2B SCSI BIOS v2.10.0
(c) 1998 Adaptec. Inc.  All Rights Reserved.

Press <Ctrl> <A> for SCSISelect (TM) Utility

Ch  A.     SCSI  ID:     0     IBM      DRVS09D   ULTRA2-LVD
```

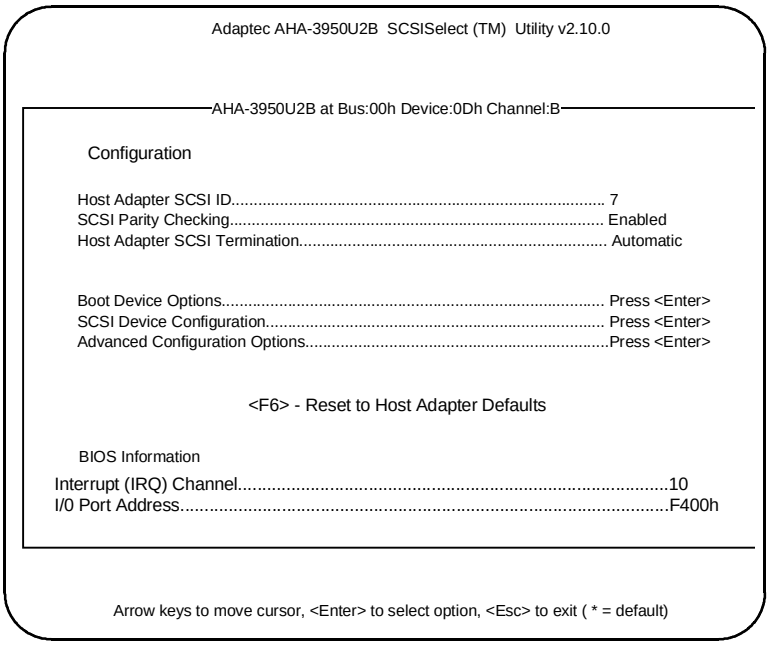
You can, at this time, press [CTRL] [A] to enter the Adaptec SCSI setup utility. The following screen will appear.


Adaptec AHA-3950U2B SCSISelect (TM) Utility v2.10.0
AHA-3950U2B at Bus: Device 00:Fh
Would you like to configure the host adapter, or run the SCSI disk utilities.
Select the option and press *Enter*. Press *F5* to switch between color
and monochrome modes.
Options
Configure/View Host Adapter Settings
SCSI Disk Utilities

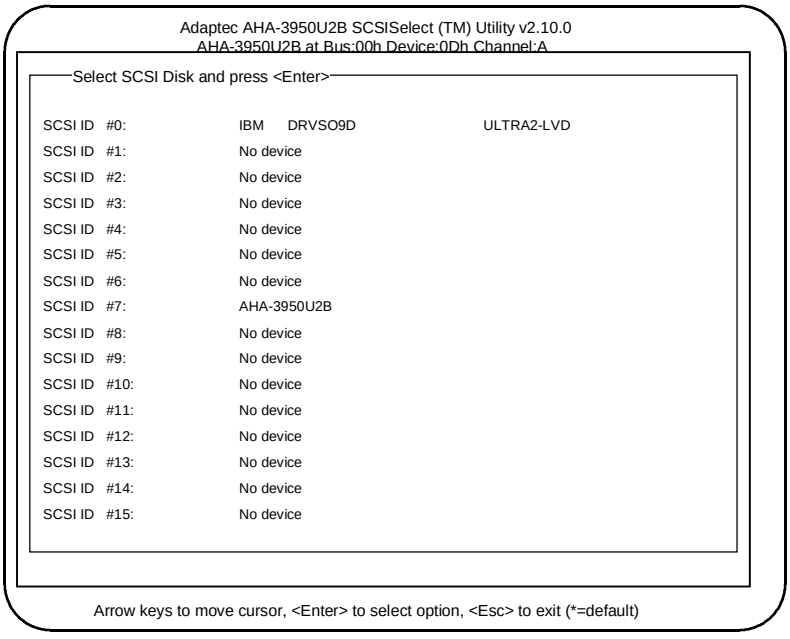
Select the channel to which your drive is attached. The screen below will follow.


Adaptec AHA-3950U2B SCSISelect (TM) Utility v2.10.0
You have an AHA-3950U2B
SCSI host adapter in your system. Move
the cursor to the bus:device:channel of the
one to be configured and press <Enter>.
Bus:Device:Channel
00:0D:A
00:0D:B
<F5> - Toggle color/monochrome
Arrow keys to move cursor. <Enter> to select option. <Esc> to exit (* = default)

Select the first option *Configure/View Host Adapter Settings.* The next screen is shown below with the default settings.


Adaptec AHA-3950U2B SCSISelect (TM) Utility v2.10.0
AHA-3950U2B at Bus:00h Device:0Dh Channel:B
Configuration
Host Adapter SCSI ID..... 7
SCSI Parity Checking..... Enabled
Host Adapter SCSI Termination..... Automatic
Boot Device Options..... Press <Enter>
SCSI Device Configuration..... Press <Enter>
Advanced Configuration Options.....Press <Enter>
<F6> - Reset to Host Adapter Defaults
BIOS Information
Interrupt (IRQ) Channel.....10
I/0 Port Address.....F400h
Arrow keys to move cursor, <Enter> to select option, <Esc> to exit (* = default)

You can accept the default settings with *Host Adapter SCSI Termination* set to Automatic. If you wish to accept the default settings, press [ESC] to return to the previous menu. Select the SCSI utilities.


Adaptec AHA-3950U2B SCSISelect (TM) Utility v2.10.0
AHA-3950U2B at Bus:00h Device:0Dh Channel:A
Select SCSI Disk and press <Enter>
SCSI ID #0: IBM DRVSO9D ULTRA2-LVD
SCSI ID #1: No device
SCSI ID #2: No device
SCSI ID #3: No device
SCSI ID #4: No device
SCSI ID #5: No device
SCSI ID #6: No device
SCSI ID #7: AHA-3950U2B
SCSI ID #8: No device
SCSI ID #9: No device
SCSI ID #10: No device
SCSI ID #11: No device
SCSI ID #12: No device
SCSI ID #13: No device
SCSI ID #14: No device
SCSI ID #15: No device
Arrow keys to move cursor, <Enter> to select option, <Esc> to exit (*=default)

This shows all devices attached to the bus. To perform a *Verify Media*, highlight the drive you would like to verify and press [ENTER]. Select *Verify Media* from the options.

If you wish to accept all settings, press [ESC] to exit out of the Adaptec settings.

Step 8: FDISK

Boot to a bootable diskette and type FDISK at the A:\ prompt. If Windows® 95 OSR2 or Windows® 98 is used, the following screen will appear.

```
Your computer has a disk larger than 512 MB.  This version of Windows
includes improved support for large disks, resulting in more efficient use of
disk space on large drives, and allowing disks over 2 GB to be formatted as
a single drive.

IMPORTANT:  If you enable large disk support and create any new drives on
this disk, you will not be able to access the new drive(s) using other operating
systems, including some versions of Windows 95 and Windows NT, as well as
earlier versions of Windows and MS-DOS.  In addition, disk utilities that were
not designed explicitly for the FAT32 file system will not be able to work with
this disk.  If you need to access this disk with other
operating systems or older disk utilities, do not enable large drive support.

Do  you wish to enable large disk support (Y/N).....? [N]
```

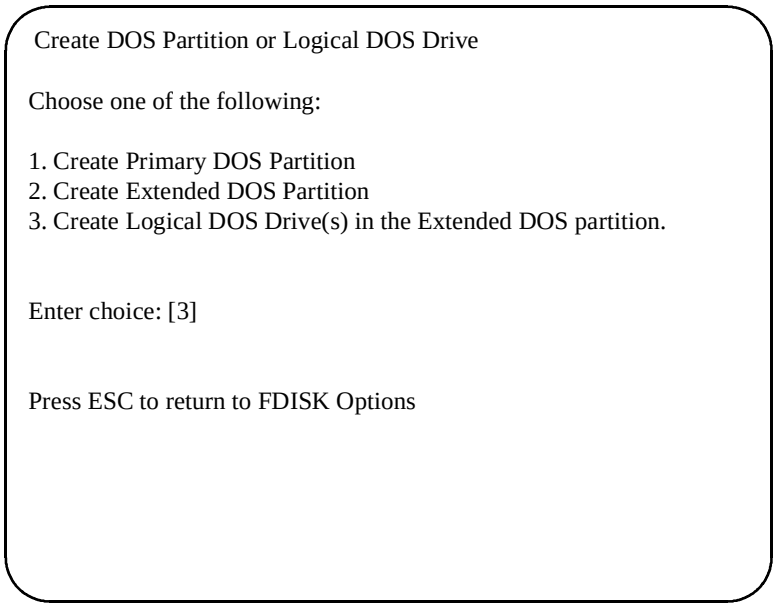
Type *Y* to select the FAT 32 file system. Type *N* to select the FAT 16 file system.

The following screen allows you to create partitions. If you have more than 1 drive there will be 5 options. Option 5 allows you to select the drive you wish to partition.

```
                PC DOS Version 7.0
              Fixed Disk Setup Program
          Copyright IBM Corporation 1983-1994

                     FDISK Options

Current fixed disk drive:                1

Choose one of the following:

1. Create DOS partition or Logical DOS Drive
2. Set active partition
3. Delete partition or Logical DOS Drive
4. Display partition information
5. Change current fixed disk drive

Enter choice:[1]


Press ESC to exit FDISK
```

Select option 1 to create a DOS partition. The screen on the following page will appear.

Select option 1 to create a DOS partition. The screen below will appear.

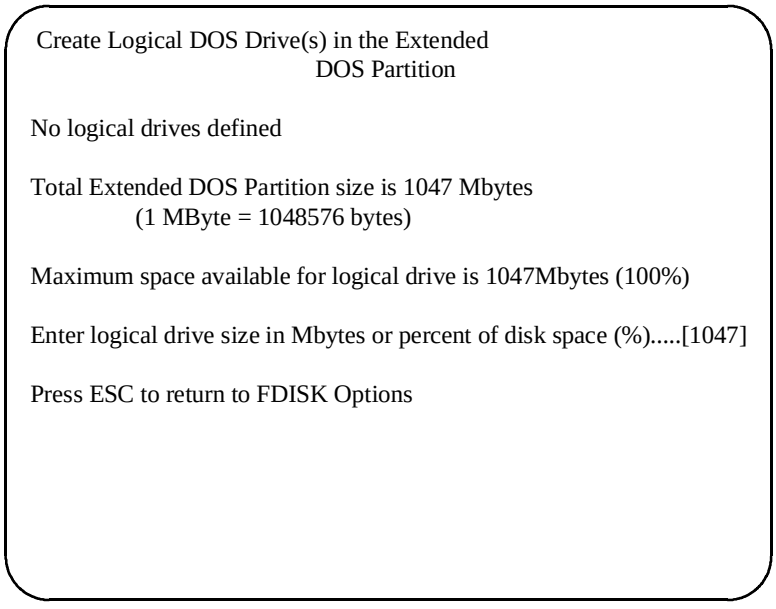

Create DOS Partition or Logical DOS Drive
Choose one of the following:
1. Create Primary DOS Partition
2. Create Extended DOS Partition
3. Create Logical DOS Drive(s) in the Extended DOS partition.
Enter choice: [3]
Press ESC to return to FDISK Options

Select option 1 to *Create a Primary DOS Partition*. If this is to be the boot drive, set this partition to "Active".

Press *ESC* to return to the FDISK options. Create an *Extended DOS Partition* by selecting option 1 from the main menu and option 2 from the second menu. (Both menus shown above.)

Note: The Maximum Capacity shows only 8455 MB instead of 9130 MB. This is because the BIOS of some systems recognizes a Megabyte as 1,048,576 bytes (binary). Drive manufacturers recognize a Megabyte as 1,000,000 bytes (decimal). The capacities are the same in actual number of bytes.

After creating the *Extended DOS Partition*, press ESC to return to the FDISK main menu. Select option 1 to create a *Logical DOS Drive*, then option 3 to create a *Logical DOS Drive in an Extended Partition*.


Create Logical DOS Drive(s) in the Extended
DOS Partition
No logical drives defined
Total Extended DOS Partition size is 1047 Mbytes
(1 MByte = 1048576 bytes)
Maximum space available for logical drive is 1047Mbytes (100%)
Enter logical drive size in Mbytes or percent of disk space (%).....[1047]
Press ESC to return to FDISK Options

Press *ESC* to return to FDISK and press ESC again to restart the system. You must restart the system for the partitions to be recognized.

Step 9: Formatting

The drive will need to be formatted before an operating system can be loaded. Format the Primary partition and any Extended partitions that have been made.

After booting from a bootable diskette, run FDISK, option 4 to display the partition information. This is helpful to review drive letter assignments. Note the drive letters to ensure proper formatting.

Press *ESC* to return to the main menu and exit FDISK. At the A:\ prompt type *format x: /s* (where x is the drive letter). The /s option will make your hard drive bootable by copying the system files to the hard drive. If you do not want this drive to be bootable, do not use the */s* command. You will see the following warning:

```
WARNING:  ALL DATA ON NON-REMOVABLE DISK
DRIVE C:  WILL BE LOST!
Proceed with Format (Y/N)?
```

Type *Y* for yes. There should be no data on the new drive. The time it takes to format the drive is dependent upon its size. When the drive has finished formatting, format the next logical drive, in this case D: by typing *format d:* You will get the same message. Select *Y*.

Step 10: Operating system installation

After the drive has been formatted, install an operating system.

Appendix

Making a bootable diskette

If you do not have a DOS bootable diskette, you may want to make one. This will be necessary for installing your new hard disk drive and in case of system failure. The DOS bootable diskette will contain files necessary to boot your system. These files are called system files. You will also want some utilities on your bootable diskette. Following are the instructions needed to add both the system files and the other helpful utilities.

- Make sure your computer is on and you insert a diskette in drive A.
- At the C:\ prompt, type *FORMAT A: /S* and press [ENTER].
- Press [ENTER] again, unless you want to label your diskette.
- Add the utilities. To do so, use some simple copy commands.
  - Type *cd Windows* at the C:\ prompt, press [ENTER].
  - Type *copy fdisk.exe a:,* press [ENTER].
  - Type *copy format.com a:*, press [ENTER].
  - Type *copy sys.com a:*, press [ENTER].
  - Type *copy chkdsk.exe a:*, press [ENTER].
  - Type *copy debug.exe a:,* press [ENTER].
- Type *cd.*
- Remove diskette from drive A:
- Write protect the diskette by sliding the small plastic tab on the diskette in the up position.
- Test the diskette.
  - Turn off your computer.
  - Insert the diskette in drive A:
  - Turn on your computer.
  - When you get to the A:\ prompt *type c:*, press [ENTER].
- If any of these steps did not work, start again at step 1.

Jumper block information

The jumper block is a block of pins located on the hard drive. When these pins are shorted with shunts (jumpers), the drive will behave in certain ways. A shunt is a small piece of plastic with metal inside that shorts out the connection between 2 pins when placed over them. These can be purchased at any local computer store. The pin pitch for all pins except for Termination Power is 2 mm. Termination Power pins have a pitch of 2.54mm.

Disable Auto Spin Up

Available on 80 pin models. When a jumper is installed, the drive will spin up automatically after power on reset. If a jumper is installed, the drive will not spin up unless a Start Unit command is received.

Disable SCSI Parity Check

Available on all models. When a jumper is installed, SCSI Parity checking is disabled.

Disable Unit Attention Pin

Available on all models. When a jumper is installed, the drive will not be able to send Unit Attention Sense information for commands immediately following a Power On Reset or SCSI Bus Reset.

Enable Auto Spin Up

Available on 50 and 68 pin models. When a jumper is installed, the drive will spin up automatically after a power on reset. If a jumper is not installed, the drive will not spin up unless a Start Unit command is received.

Enable Auto Start Delay/Delay Start 6/12

Available on all models. The Auto Start and Auto Start Delay pins control when and how the drive can spin up and come ready with the combination of the Enable Auto Spin Up jumpers. When both Auto Spin Up and Auto Start Delay are enabled, the drive start will be delayed by a period of time multiplied by the drive's SCSI address. If Auto Spin Up is disabled, these jumpers will be ignored.

Enable SCSI Terminator

Available on 50 and 68 pin single-ended models. If a jumper is installed, the internal SCSI active terminator on the drive will function.

Enable Terminator Power Supply

Available on 50 and 68 pin models. Term Power is enabled.

Enable TI-SDTR

Available on 50 pin models. When a jumper is installed, Target Initiated Synchronous Data Transfer Request Negotiation is enabled.

Enable TI-SDTR/WDTR

Available on 68/80 pin models. When a jumper is installed, Target Initiated Wide Data Transfer Request Negotiation and Target Initiated Synchronous Data Transfer Request Negotiation are enabled.

Force Single Ended Mode

Available on 68 and 80 pin LVD models. If a jumper is installed, the drive is forced to work in single-ended mode.

LED Pins
Available on all models. The LED pins can be used to drive an external Light Emitting Diode.

Controller information
The examples in this guide have used an Adaptec controller. You may have a chipset embedded into your motherboard. If this is the case, plug the cable into the port on the motherboard instead of the controller.

If you are purchasing an add-on controller card, you will need to install the controller in one of the empty slots in your computer. Remove the screw holding the metal plate in place and insert the controller into the appropriate PCI, EISA or ISA slot on the motherboard, making sure the metal plate from the controller fits into the grooves on the computer frame. Replace the screw and connect the SCSI cables to the controller and then the hard drive. If you have any questions, refer to the installation manual enclosed with your controller.

Backup and restore

One of the most common methods of backup is tape backup. Tape drives are available from IBM and other major manufacturers. This method is preferred for overnight backups that run while your business is closed or while you sleep.

Another method of backup is the removable drive. There are several brands of removable drives. The popular ZIP and JAZ drives are manufactured by IOMEGA. These drives can be used for backup and can be easily attached or removed.

Utilities

Your Ultrastar drive comes low-level formatted and free of defects. *Note: Do not attempt to low-level format your drive.* If data must be removed from the drive, there are two utilities available on the IBM Hard Disk Drive Technical Support Center Web site at:

http://www.ibm.com/harddrive

.

ZAP
Zap is a utility that will “zap” your boot sector by writing 0’s to the first 128 sectors of your drive.

WIPE
Wipe performs the function of ZAP and also writes 0's to the entire drive.

These utilities should be sufficient to return your drive to factory-shipped condition.

Drive copy

If you are replacing an existing hard drive with the Ultrastar drive, you may want to copy all your files from the existing drive to the Ultrastar. There are several software programs available that copy one drive to another.

PowerQuest Drive Copy 2.0
http://www.powerquest.com/product/dc.index.html
This utility supports all operating systems, has mouse support, selective partitioning, selective sector copying, and automatically creates a new DOS reboot disk. This utility is not limited by drive size.

QuarterDeck Systems DiskClone
http://www.qdeck.com/qdeck/products/diskclone/indexreg.html
This utility supports all operating systems and has mouse support.

ITS Systems EZ-Upgrader
http://www.itechs-systems.com/
This utility can be used with Windows® 3.1 andWindows® 95 operating systems.

Image Systems Solutions Drive-to-Drive
http://www.img-systems.com/d2ddesc.htm
This utility is for use with all operating systems, but is limited to copying drives with similar physical geometry.

FWB software Drive Up!
http://www.fwb.com/
This utility is used with Windows® operating systems only.

Compatibility matrix

The IBM SIT Lab thoroughly tests Ultrastar drives for compatibility with a wide variety of systems, controller cards, and operating systems. Testing was done to demonstrate compatibility with the following hardware and software. Other combinations of hardware and software may function with this drive, but were not tested.

Systems

ACER AP53A\P5-166 430HX
ASUS P2B-LS
ASUS BIOS V4.51 PG
Apple 6400/180
Aopen Ax6B
Compaq DeskPro EN6400
Dell Dimension XPS R450
Dell OptiPlex Gx1
Dell Precision 410
Dell PowerEdge 2300/350
Digital PC 5500
FIC PA-2013
Gateway G6-450
Gigabyte GA-6BxS
HP Kayak XA6/300MT
HP Kayak XU
HP9000 Workstation
IBM systems
ICL/Fujitsu G60i
Intel N440BX
Intel MU440EX
Micron Millenia Endeavor
Micron Powerdigm XSU
NEC Direction SPL 266
SGI 02
SGI Origin 200
SNI Primergy
Shuttle HOT-591 SpaceWalker
Tyan 1572ATX/430TX P5-200

SCSI controllers

Adaptec AHA-2940U2W
Adaptec AHA-2940UW
Adaptec AHA-2950U2B
Adaptec AHA-3940UW
Adaptec AHA-3950U2B
Adaptec AIC-7890B
Adaptec AIC-7880
Adaptec AHA-131
AdvanSys ABP940
Buslogic BT-958
Buslogic BT956C
Dell PERC 2/SC
Dell PERC II
DIAMOND Fireport 40
DPT PM 2044W
IBM NCR 53C825
Initio INT-9100 UW
Mylex AcceleRAID 250
Mylex DAC 960PD
Qlogic QLA-1080
SIIG Ultra SCSI Pro PCI
Symbios SYM53C876
Symbios SYM8951U

Operating systems

HP-UX 10.20
IRIX 6.3
MS DOS v6.22
Novell Netware v4.11
OS/2 v4.0
PC DOS v6.3
SCO Open Server v5.0
SUN OS 5.4 / 5.5.1
SCO UNIXWARE
SUN OS 5.4 / 5.5.1
Windows 95
Windows 98
Windows NT v4.0
Windows NT v5.0 (beta)2

Technical support

Before calling technical support make sure you have your drive part number, serial number, and system information.

Contact technical support via:

Web	www.ibm.com/harddrive
Voice	888.426.5214 or 507.286.5825
Fax	507.253.4111
e-mail	drive@us.ibm.com

Support is also available in Singapore at:

Voice	1800.418.9595 or (65) 6.418.9595
e-mail	drive@sg.ibm.com

Automated Fax Back Service

U.S.A.	408.256.5218
Singapore	800.418.9696
England	0800.96.6948
Germany	0130.82.6089
France	0800.902229
Italy	167.875148

Glossary

ANSI (American National Standards Institute)
ANSI is the lead organization for encouraging and developing technological standards. ANSI represents the United States in the IEC (International Electrotechnical Commission) and the ISO (International Standards Organization).

Backup
Storing information from a hard drive to another storage area in order to prevent data loss. Tape drives and Zip drives (IOMEGA) are two common mediums for saving vital information contained on a hard drive.

BIOS (Basic Input/Output System)
The BIOS is the first level of software contained in a computer. It provides basic, low level control for keyboards, video, hard disk drives, and floppy drives. It also provides the initial intelligence that allows the computer system to find an operating system to run.

Boot/Boot-up
To prepare a computer for operation by loading an operating system.

Capacity
The amount of information, expressed in bytes, that can be stored on a hard drive. Also known as *storage capacity*.

Compatibility
The capability of a hardware or software component to conform with the interface requirements of a given data processing system without adversely affecting its functions.

Cylinder
1) In an assembly of magnetic disks, the set of all tracks that can be accessed by all the magnetic heads of a comb in a given position. 2) The tracks of a disk storage device that can be accessed without repositioning the access mechanism.

Disk drive
The primary data storage device used by computers. Disk drives are used to record, store and retrieve digital information.

Electrostatic discharge
The rapid change in electrical energy caused by static electricity. This can damage or destroy electronic equipment or hardware. Electrostatic discharge can be prevented by grounding oneself before handling any electronic equipment.

FAT16/FAT32 (File Allocation Table)
The file allocation table is a group of sectors in a hard drive that contains address chains for the different files on a hard disk drive. There are usually two FATs (kept in different locations) on a hard drive. FAT32 is available in the Windows® 95 & Windows® 98 operating systems. FAT32 receives its designation because it allows 32 bits of addressing as opposed to 16 bits in the FAT16 file system.

FDISK
FDISK is a program run in DOS that allows a user to partition a hard disk drive. Partitioning your hard disk drive is essential for it to work properly.

Format
To prepare a hard drive so that it can store data. In the DOS formatting process, the computer verifies the clusters within a partition.

FTP (File Transfer Protocol)
In the Internet suite of protocols, an application layer protocol that uses TCP and Telnet services to transfer bulk-data files between machines or hosts.

Hard disk drive (HDD)
A stand alone disk drive that reads and writes data onto rigid disks and can be attached to a port on the system unit. Synonymous with *fixed disk drive* and *hard drive*.

Head
The tiny electromagnetic coil and metal pole used to create and read back magnetic patterns on the disk.

HPFS (High Performance File System)
The file system used by the OS/2 operating system.

Interface
A hardware or software protocol, contained in the electronics of the disk controller and drive, that manages the exchange of data between the hard disk drive and the computer. The most common interfaces for small computer systems are ATA (IDE) and SCSI.

Jumpers
Small pieces of plastic with a conductive center used to connect pins on a device.

Jumper settings
Different modes which are achieved by placing the jumper on particular pins on a device. These modes determine the behavior of the device. Settings are changeable by the user, but remain constant during operation. See *Jumpers.*

LVD (Low Voltage Differential)
A highly compatible computer disk drive interface that is faster and more reliable than SCSI. Also known as *Ultra2SCSI*.

Motherboard
Holds the computer's main processors and circuitry, and also contains thememory, BIOS, interconnection circuitry and expansion slots.

Multi-mode
A drive that can operate on an LVD bus or a Single-ended bus.

NTFS (NT File System)
An advanced file system used by the Windows NT operating system.

Operating system
Software that controls the execution of programs and may provide functions such as resource allocation, scheduling, input/output control, and data management. Although operating systems are predominantly software, partial hardware implementations are possible.

OS/2
A fully preemptive, multitasking operating system developed by IBM. OS/2 also supports HPFS.

Partition
A portion of a hard drive dedicated to a particular operating system or application and accessed as a single logical volume.

SCSI (Small Computer System Interface)
Pronounced “scuzzy”. An intelligent parallel peripheral interface characterized by its use of high level communication between devices.

Sector
On a hard drive, the minimum segment of track length that the hard disk drive can assign to store information.

Termination
The signals on a SCSI bus must be terminated at both ends of the bus. This is generally done automatically by the controller and requires an “external” terminator on the last connector of the bus.

Track
One of the many concentric magnetic circle patterns written on a disk surface as a guide for storing and reading data.

Wipe
Wipe is a software utility that writes zeros to every sector on a hard disk drive up to 8 GB. See *Zap.*

Windows® NT
Microsoft’s 32-bit server operating system.

Windows® 98
Microsoft operating system.

Zap
A utility in which the first 128 sectors of a hard drive are overwritten with zeros. See *Wipe.*

Zip drive
A drive which uses increased real density on floppy disk technology to increase storage capacity. Zip diskettes have a storage capacity of 100 MB.

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www.ibm.com/harddrive

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3605 Highway 52 North
Rochester, MN 55901
Telephone: 888.IBM.5214 or 507.286.5825
Fax: 507.253.DRIVE
E-mail: drive@us.ibm.com

Singapore Technology Group Support Center
Telephone: 1800.418.9595 or 65.6.418.9595
E-mail: drive@sg.ibm.com

UK Technology Group Support Center
Telephone: 44.1475.898.125
E-mail: drive@uk.ibm.com

Germany Technology Group Support Center
Telephone: 49.7032.153050
E-mail: drive@de.ibm.com

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